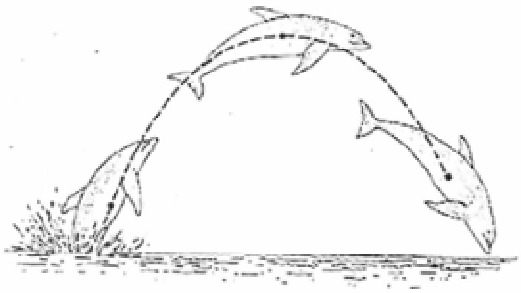
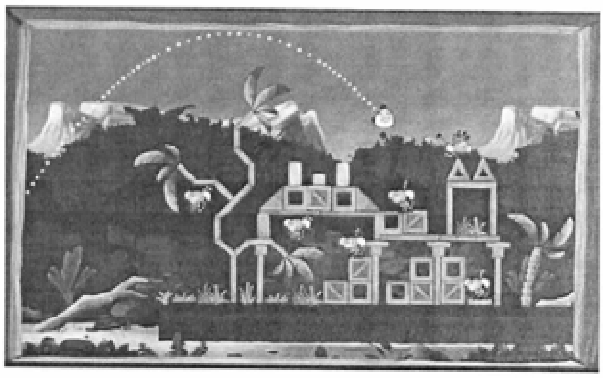
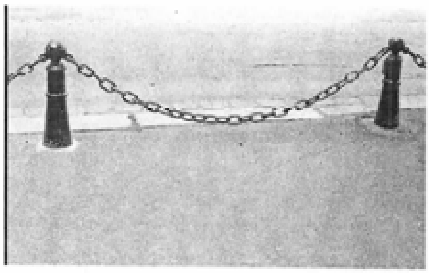
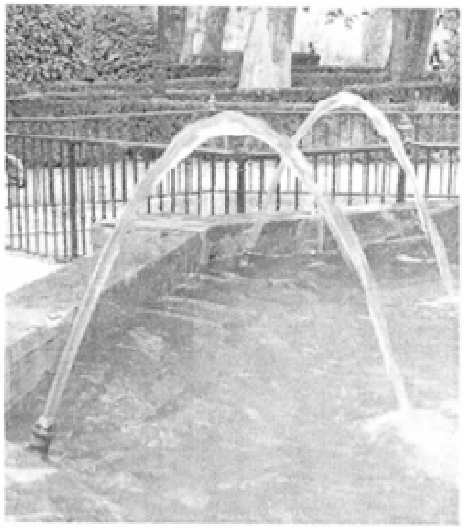
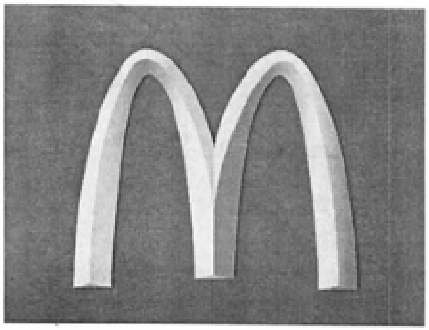
PARABOLAS ARE EVERYWHERE!!!!

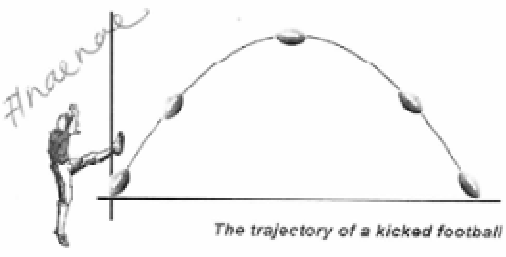




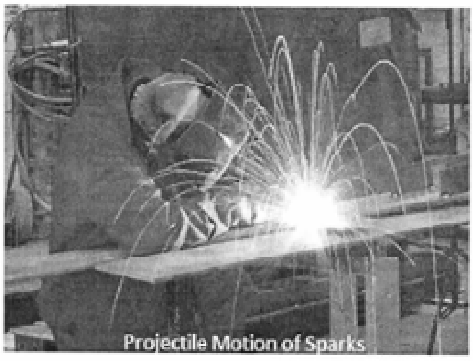








The trajectory of a kicked football



Projectile Motion of Sparks

05/12/14 Agenda

- Check Homework
    - Exploring the Discriminant Worksheet
    - Reflection Worksheet

- Chapter 9 - Quadratic Functions & Equations
    - Quadratics in the Real World

Tomorrow - More Real World Applications

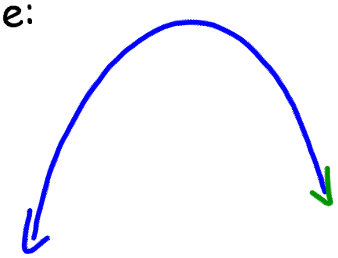
Wednesday - Thursday - Review

Friday - Test on Chapter 9

Homework
    - Finish the Notes Worksheet

Warm Up

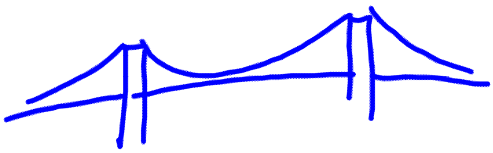
Brainstorm things that take a parabolic shape:

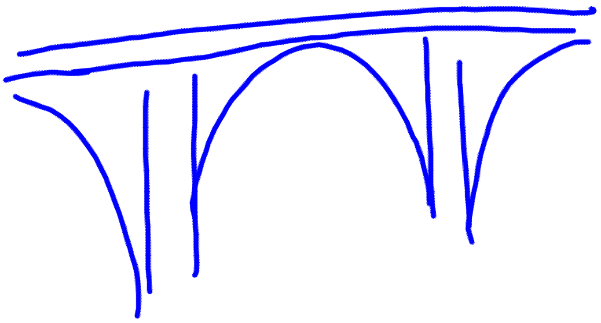


RAINBOW

ST LOUIS ARCH

SUSPENSION BRIDGE





POP FLY IN BASEBALL

FLIGHT OF A FOOTBALL
BASEBALL
SOCCER BALL

McD M

Name: _____

Reflection Questions

(This is a homework assignment to be turned in tomorrow.)

Summarize your findings from the past three pages in the table below:

Discriminant Value	# of Solutions	Sketch a (mini) graph picture
POSITIVE	2	
NEGATIVE	NO	
ZERO	1	

1. The square root of any negative number results in ERROR!. How does this relate to getting a negative value for the discriminant? What does this tell you about how the graph will look?

   NO SOLUTION

2. The square root of any positive number results in both a + and a − value. How does this relate to getting a positive value for the discriminant? What does this tell you about how the graph will look?

3. The square root of 0 results in _____. How does this relate to getting a value of 0 for the discriminant? What does this tell you about how the graph will look?

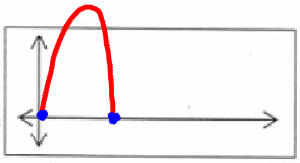
Name: _____
Date: _____

QUADRATICS IN THE REAL WORLD

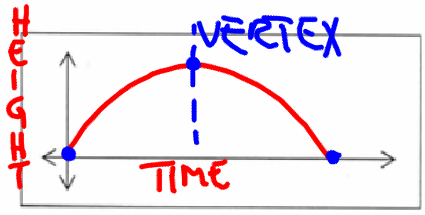
Brainstorm things that take a parabolic shape:

Today, we will explore equations of projectile (a.k.a. THROWING) motion.

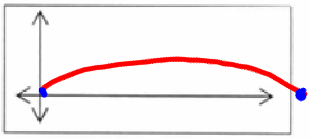
Draw a picture of something being thrown or projected into the air:



(Thrown high for short distance)



(Normal throw)



(Thrown low for long distance)

We could use *x* and *y* in the equations. Instead, we will use *t* and *h*.

What does *t* represent? TIME

What does *h* represent? HEIGHT

Using this info, go back to your drawing and label the *x* and *y* axes appropriately.

There are two spots on the graph when h will be equal to 0. Describe when they occur.

START _____ END _____

Other than looking at the graph, describe another way we could solve for t when h will be 0.

ZPP: 1. FACTOR 2. SET = 0

When the projectile (the object) reaches its highest point in the air, we call that point the VERTEX (in relation to the graph, it is a MAXIMUM).

How can we find the coordinates of the vertex (the highest point)?

First use $\frac{-b}{2a}$ then, PLUG IT IN & SOLVE $\left(\frac{-b}{2a}, \right)$

Scenario:

It's game day! The Chicago Bears are playing against the Miami Dolphins. The score is tied 35-35 with 45 seconds left on the clock. Robbie Gould kicks the football. It soars high into the air, following the path of the equation $h = -0.83t^2 + 7.5t$ where h is height in feet, and t is time in seconds.

Equation: $h = -0.83t^2 + 7.5t$

$A = -.83$

$b = 7.5$

Axis of Symmetry: $\frac{-b}{2a}$ $\frac{-(7.5)}{2(-.83)} = \frac{-7.5}{-1.66} = 4.5$

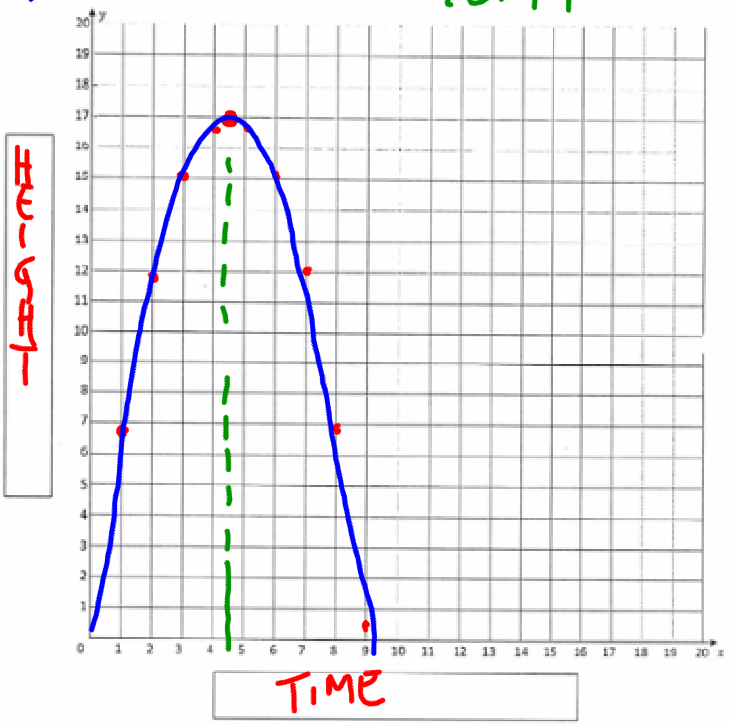
VERTEX $h = -.83(4.5)^2 + 7.5(4.5)$

$= 16.94$

Sketch the graph:

Vertex: $\left(\frac{-b}{2a}, \right)$

$(4.5, 16.94)$



t	h
1	6.67
2	11.68
3	
4	
5	

6

7

8

Analysis Questions:

1. What are the zeros (solutions)? $t = 0$ $t = 9.0361$
2. When will the ball hit the ground? _____
3. Why are there no negative x-values? _____
4. After how many seconds will the ball reach its highest point? _____